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be Nymphæas, and our Nymphæas hitherto are hereafter to be known as Castalias.—In the January *Gardener's Monthly* the suggestion is made that certain species of Cactus may become of value as fodder plants for domestic animals.—The January *Torrey Bulletin* contains Studies in Typhaceæ, by Thomas Morong; New and Little-known Grasses, by F. L. Scribner, and New Western Grasses, by George Vasey, besides other articles of interest. Professor James suggests the name Anthophyta for Phanerogamia—a very good name too.—The January *Botanical Gazette* contains a portrait of Dr. W. Pfeffer, of the Botanical Institute at Tübingen, with a sketch of the institute, illustrated with a plan and views. The index to Vol. XII., which accompanies this number, is a model among indexes. Certainly no reader of the last year's volume of the *Gazette* can complain, in Carlylean phrase, of its "indexlessness."

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## ZOOLOGY.

FUNCTIONS OF INVERTEBRATE OTOCYSTS.—Professor Yves Delage has been performing some experiments with a view of ascertaining the functions of the so-called ears of invertebrates. His results (*Archives de Zool. gén. et Expér.* v. 1886) go to show that besides auditory capacities, they possess regulative faculties. When the otocysts were destroyed, the animal could not regulate its movements. This he shows is not due to the injury to the nerve, because the extirpation of the eyes did not produce disorder in the movements. His experiments were mostly upon Crustacea and Cephalopods.

PARASITIC ROTIFERS.—The marine rotifers which are parasitic upon the curious Crustacean, *Nebalia*, are grouped in a family Seisonidæ and the species of these found in the Bay of Naples have recently been studied by Dr. L. Plate. He adds to the two genera before included (*Seison* and *Saccobdella*) a third, *Paraseison*, with four new species. In these the trochal discs have been reduced and may be represented by a few sensory setæ; the intestine terminates cæcally in either six; the reproductive glands are at the sides of or above the intestine; the tail has no sucking disk, but on the rounded extremity open the glands which serve to attach the ectoparasite to its host. The paper may be found in vol. vii. of the Naples *Mittheilungen*.

MEDITERRANEAN SYNAPTIDÆ.—Dr. R. Simon contributes to the Naples *Mittheilungen* (vii. p. 272, 1887) an account of the Mediterranean Synaptidæ, embracing the species *Synapta digitata*,

*inhærens* and *hispida*. These forms live on, not in the sand, in this not resembling our American *S. girardi*. There are some detailed accounts of the development of the calcareous plates of these as well as other Echinoderms. The author also describes a new species of Chirodota (*C. venusta*), the first recorded from the Mediterranean.

BEDDARD ON EARTHWORMS.—The literature of the Lumbricidæ is rapidly assuming frightful proportions, so that none but the specialist can keep track of it. Mr. F. E. Beddard has recently added much to our knowledge of these forms. In the *Proceedings of the Zoological Society* (p. 154, 1887), he describes as new *Thamnodrilus gubielmi* from British Guiana. This genus resembles *Anteus* by the absence of dorsal pores, in having a single pair of spermathecæ in the seventh segment, and in position of the nephridial opening. In *Thamnodrilus*, however, the clitellum is much shorter, and the differentiation of the nephridia into three series is another character separating them. Later in the same volume (p. 544), he describes *Cryptodrilus fletcheri* (n.sp.) from Queensland. It possesses calciferous glands and in its nephridia it is much like *Microchaeta* but their orifices vary in position from segment to segment. The seminal vesicles occur in segments 9 and 12, but not in the intermediate segments. A third paper (*Jour. Anat. and Physiol.* xxii, October, 1887) deals with the structure of the ovum in *Eudrilus sylvicola* from British Guiana. Here the ovary is enclosed with muscular walls, the muscles being continuous with those of the oviduct, and its interior is divided by trabeculæ into separate compartments, which are packed with ova and germinal cells. The history of these is traced, the most noticeable feature being the metamorphosis of some of the germinal cells to form an epithelial cap on one end of the ovum, while others degenerate and form a fibrous looking, and more or less fluid mass around the ovum. This degeneration may have nutritive functions, but Mr. Beddard suggests its analogy to the liquor folliculi of the mammalian ovary, a view which receives some support from the fact that the most nearly ripe ova are not always found nearest the entrance to the oviduct.

ZOOLOGICAL NOTES.—PROTOZOA.—Mr. H. B. Brady catalogues the recent species of Foraminifera, occurring in Great Britain in the December number of the *Journal of the Royal Microscopical Society*. The classification adopted is the same as that used in the Reports of the Voyage of the "Challenger." 267 species are enumerated, but one (*Trochammina robertsoni*) being regarded as new. The genus *Haliphysema* is regarded as a Foraminifera.

Dr. A. C. Stokes has recently described some more American Infusoria. In the *American Mon. Micros. Jour.* (p 141) he adds

to our fauna *Anthophysa stagnatilis* *Hexamita gyrans* *Chloromonas*, *Balanitizoon gyrans*, *Gerda vernalis* *Rhabdostyla vernalis*, *R. chaetocola*, *Vorticella similis*, *V. vernalis*, *V. parasita*, *V. conica*, *Epistylis tinctoria*, and *Lagenophrys obovata*. In the Annals and Magazine of Natural History for August, 1887, he adds: *Onychodromopsis flexilis* (n. g. et sp.) *Tachysoma agile* (n. g. et sp.) *T. mirabile*, *T. parvistylum*, *Litonotus vermicularis*, *Loxodis magnus*, *Oxytricha biforia*, *O. hymenostoma*, *O. acuminata*, *O. caudata*, *Histrio inquietus*, *H. complanatus*, *Euplotes variabilis*, and *Chilodon vorax*. The last species feeds voraciously upon diatoms, some of which were actually longer than the infusorian.

*Podarcella* is the name given by Girard to a stalked Rhizopod allied to *Arcella* which occurs in the sea near Fécamp. The stalk is about one and one-half times as long as the lorica.

WORMS.—The veteran, P. H. Gosse, describes twenty-four new British rotifers in the December number of the *Journal of the Royal Microscopical Society*. The specimens were from both fresh and salt water.

Those interested will find a valuable article on the anatomy and histology of the Aphroditaceæ, by Dr. E. Rhode, in the second volume of Schneider's *Zoologische Beiträge*, and one on the anatomy and histology of Eunice, by E. Jourdan, in the second volume (seventh series) of the *Annales des Sciences Naturelles*. Jourdan thinks he has found the terminations of the nerves in the muscles; does not regard the "giant nerve fibre" of the ventral cord as nervous but rather as a supporting structure; describes the eye, found no glandular structures in the digestive tract, and describes the segmental organs, pedal glands, and pigment organs.

CRUSTACEA.—It is usually believed that hermit-crabs appropriate dead shells for their homes but Mr. Lucas, in the *Transactions* of the Royal Society of Victoria, states that he witnessed a hermit attack a living *Fasciolaria* and little by little tear it in pieces, leaving the shell at last entirely empty. He also recalls the fact that, at least in tropical waters, the shells occupied by hermit-crabs have a fresh appearance, and he thinks that the crabs depend upon living shells rather than dead ones to form their homes. This certainly is not the case with the hermit-crabs in the colder Atlantic.

Leichmann has settled by means of sections the existence of two polar globules in the egg of *Asellus aquaticus*. His short paper may be found in number 263 of the *Zoologisches Anzeiger*.

The complete account of J. Nusbaum's investigations on the embryology of the opossum shrimp (*Mysis*) may be found in Lacaze Duthier's *Archiv. Zool. Expérim. et Générale*, vol. v. An abstract of his preliminary note was given in our pages last year (*AM. NAT.* xxi. p. ).

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## ENTOMOLOGY.<sup>1</sup>

THE CAUSE OF THE GROWTH OF GALLS.—Herr M. W. Beyerinck has published a paper regarding the growth of the gall produced by a saw-fly, *Nematus capreae*, on *Salix amygdalina*.<sup>2</sup> This article appears to be an important supplement to the observations of Adler, published some years ago. I have not seen the original paper by Beyerinck, and therefore quote from an abstract of it.<sup>3</sup>

“The production of the gall is undoubtedly due to the matter secreted by the poison-gland, which is, consequently, homologous with the poison of Hymenoptera aculeata; when the insect does not deposit an egg in the wound which it makes, the quantity of albuminous matter poured out by the vesicle is always less than when an egg is deposited; by careful observation it is possible to assure oneself that the size of the gall is always proportional to the size of the wound and the quantity of albuminoid matter introduced. By an experiment, in which the deposited egg was punctured by a fine needle, it was shown that the gall is due to the parent and not to the egg; but, of course, in such a case the gall remains small; neither the egg nor the larva are necessary for its production, though their presence exercises a certain influence on the regularity of the development.”

“The author has endeavored to discover whether there is any persistent alteration in the protoplasm of the plant or not. If we suppose that the substance implicated in the substance of the gall is like the protoplasm of the plant, a living body able to grow indefinitely, or a substance which impresses a persistent modification on the protoplasm of the plant, we ought, if we should succeed in pushing the development of the gall as one of its parts beyond the stage at which it ordinarily stops, to find that the characters of the gall remain invariably the same. If, on the other hand, the gall-forming matter can not either grow itself nor form a new protoplasm capable of reproduction, we ought, under similar circumstances, to find the characters of the organ, whence the gall was developed,

<sup>1</sup> This department is edited by Prof. J. H. Comstock, Cornell University, Ithaca, N. Y., to whom communications, books for notice, etc., should be sent.

<sup>2</sup> *Arch. Néerland. Sci. Exact. et Nat.*, XXI. (1887), pp. 475–92.

<sup>3</sup> *Jour. Roy. Micr. Soc.*, 1887, p. 746